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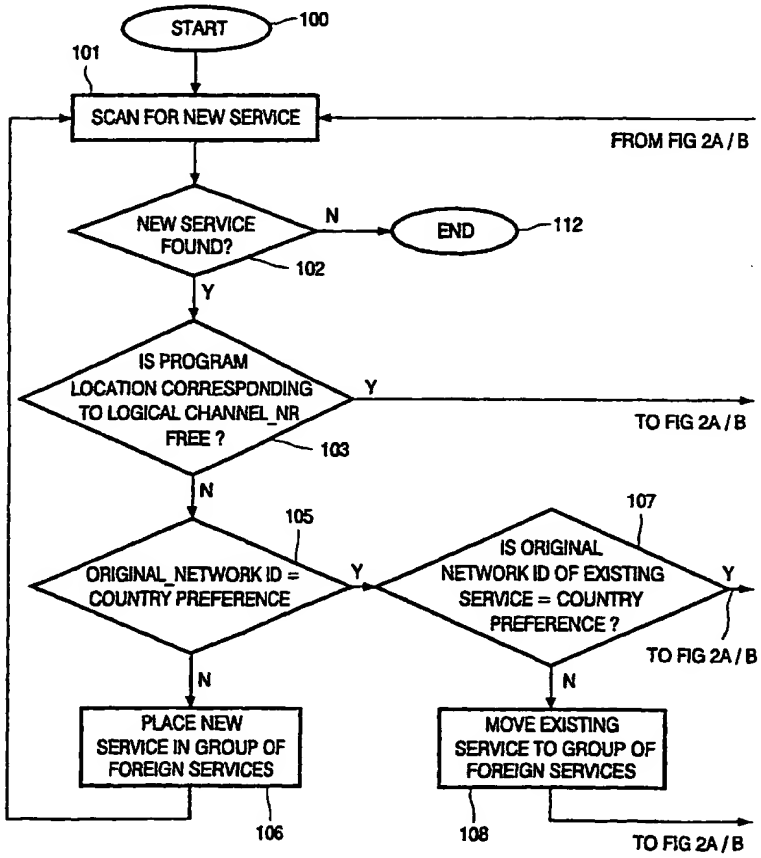

(57) Abstract: Method for assigning program locations in a receiver to individual received broadcast signals in accordance with predetermined assignment rules where the broadcast signals originate from various transmitters, said method comprising providing the broadcast signals with information about at least the country of origin, the transmitting network, a unique service identification and a logical channel number, and said method being characterized in assigning in the receiver a program location to the received broadcast signal in accordance with said assignment rules based on the received information about the country of origin, about the transmitting network, the unique service identification and the logical channel number.

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Method for assigning program locations in a receiver

The present invention relates to a method for assigning program locations in a receiver, preferably a digital receiver for terrestrial signals, to individual received broadcast signals where the broadcast signals originate from various transmitters, and to a receiver for such signals.

Most modern analogue television receivers, such as TV sets, video recorders, satellite receivers or the like have a plurality of preprogrammable numbered program locations to which a specific receiving channel may be assigned. That is to say, the particular settings of the tuner in the receiver necessary to receive a service on a specific channel are stored in the receiver and will be used if the program location is selected, eg. by selecting on the remote control or directly on the set the number corresponding to that program location. Once specific channels have been assigned to desired program locations this allows the user to easily tune the receiver to a specific receiving channel simply by selecting the appropriate program location by pressing buttons on his remote control. In order to make this as convenient as possible the user will usually try to fill up the program locations in such a manner that the most viewed services are assigned the lowest numbers because this allows him to select the service by pressing one single button. Less watched services may then be assigned to program locations with less convenient numbers such as two or more digit numbers.

If he has more than one receiver, eg. several TV sets around the house or a video recorder connected to a TV set he would for obvious reasons desire to have the same services assigned to the same program locations on all his receivers, in order to remember at which program location a specific service is to be found.

This aspect becomes increasingly important with the advent of digital terrestrial broadcasting, in particular of television, allowing up to five times as many services to be transmitted as compared to the traditional analogue television broadcasting.

As there is some inconsistency between the terms used in analogue and digital systems it should be noted that in the above as well as the following distinction is made between program locations, networks, channels, and services.

A service is understood as transmissions with a specific content from a service provider, such as the nation wide service of a public service television provider.

A network is in digital broadcasting understood as one or more transmitters transmitting a consistent package of services. Ie. this may be several transmitters distributed over a country all transmitting all the services of a nation public service provider or transmitting all the services of a commercial service provider. It may also be one single local transmitter transmitting a single service to a local area.

Traditionally in analogue radio and television systems a channel is understood as the predetermined frequency band or bands allocated to the transmission of a signal carrying a service in order not to disturb other signals carrying the same or different services. This understanding, however, is insufficient when it comes to modern digital transmission systems where the signals from several services may be transmitted on the same frequency using multiplexing techniques. Accordingly the term channel in the following description does not refer to the actual frequency or physical channel but rather to a multiplexed channel.

Program locations are understood as the preprogrammable locations to which tuning data allowing reception of a specific service are allocated, eg. the number under which these data are stored.

It is well known that many people find the programming of their receivers difficult or at least cumbersome. Some people find the programming so difficult or even impossible that they have to rely on the help of others.

This is independent of whether it is the initial programming of the receiver in accordance with the channels in which services may be received at the site of the receiver, or be it reprogramming of the receiver if the receiver is moved to another site or if changes in the channels where services may be received occur.

Such changes could be the removal of a service. The channel in which this service was received would then be vacant, ie. no service transmitted in that channel at all, or, as is often the case in systems where the number of actual channels are limited, be used for transmission of a different service. If such a change occurs the user suddenly finds a gap or a new service at a given program location in the receiver. It is likely that he might not desire to have such a gap or this new service at that specific location. Accordingly he would have to go through cumbersome reprogramming of his receiver. If he has more than one receiver eg.

several TV sets around the house or a video recorder connected to a TV set the reprogramming becomes increasingly complicated because he would for the above obvious reasons desire to have the same services assigned to the same program locations on all his receivers.

As mentioned earlier this aspect becomes increasingly important with the increased number of services which will eventually be available in digital terrestrial broadcasting, and steps have been taken towards facilitating the assignment of channels to program locations in digital receiver for terrestrial broadcasts.

In existing digital broadcasting systems such as DVB all transmissions are supposed to be tagged with identification information identifying both the country (original_network_id) and the network (network_id) from which the service originates as well as an information (service_id) identifying the actual service transmitted. In order to achieve a consistent allocation of services to programme locations in the a receiver information about a preferred programme location (logical_channel_number) is transmitted. Such a system is eg. described in the document: Digital TV Group, "Digital Terrestrial Television, Requirements for Interoperability", version 3.01, October 7, 1998. Available from DTG, Liss Mill, Hants, GU33 7BD, United Kingdom.

The logical_channel_number are allocated on a by-country basis based on mutual agreement among the different service providers. Accordingly in one country the logical_channel_numbers are allocated uniquely according to this agreement. Thus, services with the same original_network_id and service_id have the same logical_channel_number.

Accordingly, when a receiver is first initialised it allocates all services that may be received at a given location to these predetermined programme locations. The receiver will then ideally contain all the services that it may receive allocated according to the same scheme independent of where in the country it is situated.

Though this system may work well for one country taken alone problems arise when services can be received from neighbouring countries, because these services are likely to have logical_channel_numbers conflicting with the ones used in the country where the receiver is situated. Likely because the service providers within every country are likely to agree on logical_channel_numbers starting from one and using as many as necessary.

Until now it has been up to the user to resolve such conflicts. The consistent allocation of services to programme locations is thus jeopardized because each individual

user would resolve these conflicts in a different way. Moreover it would be cumbersome and a nuisance to the user to have to manually resolve these conflicts, typically using a remote control and menus displayed by the receiver.

Moreover if a service is removed or replaced with a different service it has been up to the user to fill the gap or rearrange the services, respectively.

It is an object of the present invention to provide a method for the automatic allocation of services that overcomes these drawbacks.

According to the invention this object is in a method according to the opening paragraph achieved by providing the broadcast signals with information about at least the country of origin, the transmitting network, a unique service identification and a logical channel number and by assigning in the receiver a program location to the received broadcast signal in accordance with assignment rules based on the received information about the country of origin, about the transmitting network, the unique service identification and the logical channel number.

In one embodiment of the invention a service, corresponding to a received broadcast signal and identified by the unique service identifier, is given a country preference by primarily assigning it to the program location in the program location list corresponding to the logical channel number and in case of conflict of logical channel numbers giving preference to any broadcast signal containing information of country of origin corresponding to a predetermined indication of country preference.

This overcomes the problem of resolving the conflicts between logical channel numbers transmitted from different countries. In particular this may be done in a consistent manner independently of the user.

According to an advantageous aspect of the invention any service not given country preference is placed in a group of services having consecutive program location numbers in the list of program location numbers, the program location numbers being different from the respective logical channel numbers of the services.

This allows foreign services to be arranged in groups of services. The services will get higher numbers in the list of program locations. Accordingly these foreign services, which are per se considered of less interest to the user, will not take up the low program locating numbers, in particular one-digit numbers, which are easy for the user to press on his remote control.

In an embodiment of this aspect services with the same country of origin are arranged together in subgroups within said group of services not given country preference.

This allows services from neighbouring countries arranged country by country. It will then be easier for the user to remember where services form countries with languages that he understands are to be found in the program location list.

In a preferred embodiment preference is given to the signal with the highest signal strength is in case of conflict of logical channel numbers and country of origin.

This generally allows the regional service of the user to be placed at a convenient place in the list of program locations.

In an alternative embodiment preference is in case of conflict of logical channel numbers and country of origin given to any broadcast signal containing information of network of origin corresponding to a predetermined indication of network preference.

This allows for the receiver to positively place the preferred regional service at the most convenient location in the program location list. It does however involve that information of geographic location of the receiver, is input, preferably by the user.

In a further preferred embodiment any service not given regional preference is placed in a group of services having continuous program location numbers in the list of program location numbers, the program location numbers being different from respective logical channel numbers of the services.

This allows all the regional services, except the preferred one, to be easily found in the program location list because they are all in one group, the location of which easier for the user to remember.

In a further preferred embodiment the group of services given neither country preference nor regional preference are placed in subgroups of groups of services with the same country of origin.

This allows foreign regional services to be arranged as a subgroup within the respective groups of services from foreign countries.

In another preferred embodiment of the invention a map of which logical channel numbers are allocated to which program locations is stored.

This may be used to keep track of which logical channel number transmitted by the transmitter from which the signal is received is allocated to which program location. This allows the association between the program location and the logical channel number to be re-established later, eg. in case of a changed reception situation, a reconfiguration of

services transmitted on the network or networks of transmitters, or in case of a temporarily wrongly transmitted service information confusing the receiver.

Further it is preferred that a map of which transmitting network were previously associated with which program locations is stored.

This information may then be used to give priority to the previously stored network when trying to allocate several alternative new services to this program location.

Also, according to the invention this object is in a receiver according to the opening paragraph achieved by the receiver comprising means for extracting information about the country of origin of the signal, the transmitting network, a unique service identification and a logical channel number,

and means for assigning the received signal to a program location in accordance with the extracted information and a set of assignment rules stored in the receiver.

This allows a user to program or reprogram his receiver at different geographic locations thereby maintaining a high degree of consistency in the assignment of services to given program locations. That is to say, to the extent that the services available correspond, the user will automatically find the same services at the same program locations on his receiver after reprogramming thereof.

Moreover the system allows nation-wide consistency between receivers as to the assignment of services to program locations, provided of course that a specific service is available. That is to say, where ever the user goes he is likely to find a given service of interest on arbitrary receiver. That is to say, not only within his own household but also other receivers such as receivers at friends or neighbours residences or in public places such as clubs, pubs or hospitals etc.

The invention will now be exemplified in sets of rules and described in greater detail based on the figure on which,

fig. 1 is one half of a flowchart describing common parts of two embodiments of the invention,

fig. 2a is the second half of the flowchart of fig. 1 describing one embodiment of the invention,

fig. 2a is the second half of the flowchart of fig. 1 describing a second embodiment of the invention,

fig. 3 is a schematic representation of a receiver implementing the invention.

In existing digital broadcasting systems such as DVB all transmissions are supposed to be tagged with identification information identifying both the country (original_network_id) and the network (network_id) from which the service originates as well as an information (service_id) identifying the actual service transmitted. In order to achieve a consistent allocation of services to programme locations in the receiver information about a preferred programme location (logical_channel_number) is transmitted.

The logical_channel_number are allocated on a by-country basis based on mutual agreement among the different service providers. Preferably this is done in conjunction with the appropriate co-ordinating authorities. Accordingly in one country the logical_channel_numbers are allocated uniquely according to this agreement. Thus, services with the same original_network_id and service_id have the same logical_channel_number.

These logical_channel_numbers are used directly in the receiver as identification of the program location to which a service should be allocated.

Accordingly the broadcasters should comply with the following rules.

To ensure that the resulting allocation of all services that may be received at a given location is easy to remember and without gaps, the logical_channel_numbers preferably have no more than two digits, though three-digit numbers could under certain circumstances be necessary. Preferably the logical_channel_numbers are allocated starting with 01. Often it would be natural to allocate the number 01 to the oldest service from a national public service provider, because it typically has this number in its name. 02 for the second service of the same national public service provider etc. Other services such as commercial broadcasters could have higher numbers, eg. also relating to a number present in their name.

Within the scope of one network logical_channel_numbers should be allocated uniquely. Services with the same original_network_id/service_id shall have the same logical_channel_number. When defining regional variants of the same service the same logical_channel_number can be used. Eg. in neighbouring networks. This facilitates the definition of a consistent and compact numbering scheme taking into account the national/regional/local channel numbering. Further it indicates to the receiver that services with the same logical_channel_number are similar, eg. regional variants.

The receiver could resolve conflicts between regional variants by using the signal strength.

Based on the rules outlined above for the broadcasters manufacturers of receivers, such as television sets, set-top boxes, video recorders etc. may include the automatic channel numbering features in their receivers. For the automatic channel numbering according to this invention to be properly implemented by the manufacturer, however, a set of receiver rules has to be complied with.

When a receiver service list is first initialised, that is to say scans through all the possible channels trying to receive signals on these, the receiver shall allocate the services according to the following rules.

I1) It shall attempt to allocated the services to a program location in a programme location list corresponding to the logical_channel_number for that service. Thus if there is only one service with a particular logical_channel_number this service shall be allocated to this program location in the list.

However there are basically two kinds of conflicts between identical logical_channel_numbers. One is the national, where networks in different countries transmit the same logical_channel_numbers. The other is when two different national networks transmit the same service.

I2) Accordingly the receiver shall resolve any conflict between services that use the same logical_channel_number.

National preference is preferably given to services with the same preferred original_network_id , since the original_network_id is effectively a country code this ensures that the services primarily allocated to program locations in the receiver are all from the user's country. Provided of course that this country code is set in the receiver. Preferably the conflicting services with foreign original_network_id's which have lower priority are arranged together in groups, preferably in one or more groups in the program location list in which all services have the same original_network_id. Within these groups the services with the lowest logical_channel_numbers should be allocated the lowest program location numbers in the program location list.

If desired, the arrangement of the groups of services with foreign original_network_id's could be in accordance with the manufacturer's knowledge about which languages used in foreign, and in particular neighbouring countries, the user is most likely to understand.

Preference is secondarily given to regional versions of the same service. Typically such regional versions transmit the same overall features such as film, entertaining and national news, but have time slots with different features such as local or regional news. Since all networks are to broadcast non-conflicting numbers these can be used to resolve such conflicts, because the services will be transmitted from different networks. This, resolution may eg. be based on a preferred network specified by the user, or based on the signal strength of received services. Ie. that service among several with same logical_channel_number and original_network_id having the strongest signal strength is considered to be the regional.

I3) As to the other services with the same logical_channel_number and original_network_id they should preferably arranged in groups in the program location list. These groups may have an allocation in the program allocation list independently of original_network_id or as subgroups of groups of services having the same original_network_id. If some preferred ordering is agreed upon it is recommended to preserve this information.

I4) If a service, as it may sometimes be the case, does not have an associated logical_channel_number it shall if it has an original_network_id be placed after the respective groups of services allocated to program locations under I1) or I2).

I5) If a service does not have an original_network_id it should be placed at the bottom of the list, ie. allocated a position having a higher number in the list of program locations than any other service identified thus far during the initialising.

Using these rules the receiver will give an easy and generally consistent allocation of services in the list of program locations. The degree of consistency between receivers from different manufacturers will moreover depend on the degree to which they can agree to the schemes uses for the grouping and subgrouping under I2).

The above rules I1 to I5 are implemented in a receiver as depicted schematically in fig. 3 and described in more detail further below. The flowchart depicted on fig. 1 in combination with fig. 2a and 2b, respectively, shows an example of the steps that a receiver goes through when initializing. The flowcharts depicted in fig. 1 in combination with the respective figs. 2a and 2b are alternatives. Thus, both of these flow chart show the steps that a receiver may through when initializing.

As will be seen the two alternatives only distinguishes themselves by the steps 109a and 109b, respectively. All other steps are identical.

Reference is first made to fig. 1. The initializing process carried out by the receiver starts in 100. Eg. the first time the receiver is switched on, or by the user selecting

initializing or reinitializing option in a menu. It is assumed that at this stage the program location list stored in an internal non-volatile memory of the receiver is empty.

The receiver then starts scanning the a available channels for services in step 101 until it finds a service. This service in the following referred to as new until the time it has been assigned to program location in the program location list.

If it finds a new service the receiver checks the logical_channel_nr contained in the signal in the step 103. If the program location having the same number in the program location list as the logical_channel_nr is free the new service found the receiver proceeds to step 104 in either one of figs. 2a and 2b and assigns the service to channel.

It then continues the scanning in step 101 until it finds another new service. This cycle is repeated as long as the receiver finds new services with logical_channel_nr's matching free program locations in the program location list, or possibly until the receiver has scanned all available channels. In that case the receiver does not find any new services and ends the initializing the step 112.

If the receiver finds a new service matching a program location already occupied the answer to step 103 is no, and the receiver proceeds to step 105.

In step 105 the receiver checks whether the original_network_id contained in the signal is equal to a predetermined country preference stored in the receiver. This country preference stored in the receiver is preferably set by the manufacturer prior to shipment to a specific country, but may of course also be changed manually by the user.

If the original_network_id is different from the country preference the, service is identified as foreign and is in step 106 placed in a group of foreign services. The receiver then continues the scan for new services in step 101.

In step 105 the receiver may, however, find that the original_network_id is identical to the preferred country.

The receiver then in step 107 checks the original_network_id of the exiting service in the program location list.

If the original_network_id of the new service is not identical to the country preference stored in the receiver, the receiver moves the existing service to an appropriate group of foreign services in step 108. After having moved the existing service the receiver proceeds to step 104 in fig. 2a or 2b and places the new service at the location in the program location list corresponding to its logical_channel_nr.

If the existing service is not a foreign service it has an original_network_id corresponding to the country preference stored in the receiver. Accordingly the answer in step 107 is yes and the receiver proceeds to step 109a on fig. 2A or to 109b on fig. 2B.

In step 109a the receiver checks which of the signals of the existing and the new service, respectively, have the higher signal strength. The one with the higher signal strength is considered the more local, and thus to be the regional variant of interest. Thus if the new service does not have higher signal strength than the one already in the program location list, the new service is considered of less interest. The receiver then, in step 110 places the new service in a group together with other regional variants of the same service. It should be noted that such a group may of course contain one service only.

After having allocated the new service a place in the program location list, the receiver continues the scan in step 101.

If, however, the receiver finds in step 109a that the new service has a higher signal strength it proceeds to step 111 where it moves the existing service in the program location list to a location in a group of regional variants. Like the groups of foreign services such a group may also consist of one service only.

After having moved the existing service to a new location in the program location list, it allocates, in step 104, the new service to the program location number corresponding to the logical_channel_nr of the service, and continues the scan in step 101.

An alternative to the use of the signal strength as the criterion for identifying the most local service is to use the network_id contained in the signal. In this alternative the receiver contains at least a stored predetermined regional preference. In step 109b in fig. 2b the network_id's of the existing and the new service are compared to the predetermined regional preference. If the new service is not preferred it is placed in the group of regional variants in step 110 and the scan continued in step 101.

If on the other hand the new service is preferred over the existing one the existing service is as already described in moved to the group of regional variants in step 111, the new service a allocated to the program location corresponding to its logical_channel_number and the scan continued in step 101.

If during the initializing scan the receiver finds an unidentified service. That is to say if the signal does not contain the identifiers it should, that service is placed below all other found services in the program location list. Preferably this takes place in a step (not shown) between steps 102 and 103.

It is evident that not all users would want their receiver to dictate an allocation scheme. Eg. the user may want to group together services according to topics. Eg. a group of services mainly featuring sports, a group of services mainly featuring music, a group of serviced directed mainly towards children etc. Accordingly the receiver according to the invention allows the user should be able to do so. Also, the receiver according to the invention allows the user to reinitialize the channel list, eg. if he moves permanently to a different country out of reach of the services originally received.

If changes are less drastic, eg. if one or more existing networks are reconfigured by addition or deletion of services, by a service being moved to another network, or if a whole new network with new services is introduced, the allocation of services to program locations in the receiver may also be changed.

In case of reconfiguring of existing networks the receiver must obey the following rules.

C1) When the receiver detects a change in the services offered, including the addition and deletion of multiple services, it shall first remove all services that can positively be determined as being permanently removed. Not until then shall it try to add new services.

C2) Having removed deleted services it shall attempt to find suitable replacement services for the services removed previously under C1).

C3) In the attempt to find suitable replacement services the receiver should try to find successor services for the ones removed having the same combinations of logical_channel_number, network_id and original_network_id as the ones previously removed from the program location list.

C4) The receiver should replace services of other networks no longer available with remaining new services. That is to say match only logical_channel_number and original_network_id. In this replacement the receiver should comply with rule I1) of the initializing procedure in order to select the most suitable replacement service.

If the receiver detects a new service to be added to the program location list it shall obey the following rule.

A1) The receiver should first try to allocate a program location according to the replacement service rules C3 and C4.

A2) The receiver should try to allocate the new service according to its logical_channel_number.

A3) In case of a conflict the receiver should try to allocate the service to a free program location.

By applying the replacement rules C1) to C4) and the addition rules A1) to A3) it is ensured that new services get an allocation in the program location list corresponding in the highest possible degree to what the user was used to before the changes and thus expects to find. If the user accordingly finds that the new service has been added to the end of the program location list, but rather wants it somewhere else, he is of course free to move it manually or even reinitialize the receiver.

Finally if a service is to be removed from the program location list the receiver deletes the service visibly from the list, but preserves the information about logical_channel_number original_network_id, network_id and service_id of the removed service. This information can then subsequently be used the next time changes take place and the replacement rules C1) to C4) or addition rules A1) to A3) are to be applied.

If, after the application of the above rules in the receiver any new services remain unallocated the receiver should allocate these according to the general allocation rules I1) to I5) used in the initializing of the receiver. It should however not change existing allocations, as this would be in conflict with the user's interest in always finding the services where he expects them to be.

If, however, empty program locations exist there are two possibilities, depending on preference. One is to always leave the gap open for a possible replacement according to the above replacement and addition rules. The alternative is to fill these gaps with new services, thus blocking future replacement of a deleted service with a service according to the rules. Thus the interests of the user in not having gaps in the program location list has to be weighed against the possibility of a intentional temporary removal of a service leading to it being moved to another program location because its location has been taken. In the interest of consistency between receivers from different manufacturers this should be decided and agreed upon among them.

As mentioned above fig. 3 schematically depicts an exemplary embodiment of a receiver 200 capable of implementing the method of the invention.

The receiver 200 receives an input 201 in the form of at television signal. In the illustrated embodiment the input signal 201 is received via an antenna, but could in principle just as well be received via a cable network or a satellite dish.

A tuner and decoding means 202 detects and converts the received input 201 to digital signals in the present case representing sound and video of a television signal. The signal could, however, be any kind of digital signal eg. representing a computer program or an internet homepage.

The digital signals representing sound and video of a television signal is in the output circuitry 207 converted to a output signal in the form of a television signal . That is to say a signal which may be used by eg. a conventional analogue television receiver. The invention is however not restricted thereto in the sense that the receiver may be an integral part of a digital television or a video recorder, though which the television signal is then output.

The tuner and control means 202 is controlled by means of a control unit 203. Preferably this control unit comprise a microprocessor performing various functions, inter alia the initializing and the update of the program location list stored in a non-volatile memory 204. The receiver 200 preferably further comprise a non-volatile memory 205 storing data about country and regional preferences. Though the memory 205 storing data about country and regional preferences for illustration purposes is displayed separate from the memory 204 storing the program location list, they may very well be one and the same physical memory chip.

The control unit 203 may be controlled by the user via a user input 209 and a user interface 206. The user interface on one hand receives input commands from the user, eg. issued via his remote control, and on the other hand it interactively responds to the users commands by displaying corresponding menus on via the output circuitry 207. These menus eg. being displayed on a television set connected to the receiver 200.

Using his remote control the user may issue commands to the control unit via the user input such as a command for initialization of the receiver. Upon such command the control unit clears the program location list in the memory 204. It the controls the tuner and decoder means to scans through all the available channels according to the procedure described in relation to figs. 1 and 2a or 1 and 2b. If the procedure according to figs. 1 and 2b is used the preferences stored in the memory 205 are used. If the user desires he may also via the user input and the control unit 203 change the preferences, in particular he may do so before effecting the initializing. After initializing he may still via the user input 209 and the control unit 203 manually alter the contents in the program location list in the memory 204. He may also effect the control unit 203 to carry out scans for changes, additions and deletion in the services that may be received. The control unit then updating the program location list according to the rules A1) - A3) or C1) - C4) described earlier.

The key issues of the system described above provides are considered to be.

The system automatically assigning services to the programme location list of a receiver in view of the country and regional preferences of the user.

The country discrimination between services is done by effecting the receiver to use information in the broadcasts to discriminate between broadcasts from different countries by means of the original_network_id foreseen to be transmitted in terrestrial DVB systems.

The regional discrimination is done by effecting the receiver to use information in the broadcasts to discriminate between broadcasts from different networks by means of the network_id foreseen to be transmitted in terrestrial DVB systems.

The method keeps the list of program locations as constant as possible in situations of changing network configurations, changing location of the receiver or changing reception conditions. This is done by remembering previous services and looking for replacements for these. This also makes the system robust against any form of accidental removal of a service as long as such an error is restored timely.

CLAIMS:

1. Method for assigning program locations in a receiver to individual received broadcast signals where the broadcast signals originate from various transmitters, said method comprising providing the broadcast signals with information about at least the country of origin, the transmitting network, a unique service identification and a logical channel number, and said method being c h a r a c t e r i z e d in assigning in the receiver a program location in a program location list to the received broadcast signal in accordance with assignment rules based on the received information about the country of origin, about the transmitting network, the unique service identification and the logical channel number.

2. Method according to claim 1, c h a r a c t e r i z e d in that a service corresponding to a received broadcast signal and identified by the unique service identifier is given a country preference by primarily assigning it to the program location in the program location list corresponding to the logical channel number and in case of conflict of logical channel numbers giving preference to any broadcast signal containing information of country of origin corresponding to a predetermined indication of country preference.

3. Method according to claim 2, c h a r a c t e r i z e d in that any service not given country preference is placed in a group of services having consecutive program location numbers in the list of program location numbers, the program location numbers being different from the respective logical channel numbers of the services.

4. Method according to claim 3, c h a r a c t e r i z e d in that services with the same country of origin are arranged together in subgroups within said group of services not given country preference.

5. Method according to claim any one of claims 2 to 4, c h a r a c t e r i z e d in that in case of conflict of logical channel numbers and country of origin preference is given to the signal with the highest signal strength.

6. Method according to any one of claims 2 to 4, c h a r a c t e r i z e d in that in case of conflict of logical channel numbers and country of origin regional preference is given to any broadcast signal containing information about the transmitting network corresponding to a predetermined indication of network preference.

7. Method according to claim 6, c h a r a c t e r i z e d in that any service not given regional preference is placed in a group of services having continuous program location numbers in the list of program location numbers, the program location numbers being different from respective logical channel numbers of the services.

8. Method according claim 7, wherein the group of services given neither country preference nor regional preference are placed in subgroups of groups of services with the same country of origin.

9. Method according to any preceding claim, c h a r a c t e r i z e d in that a map of which logical channel numbers are allocated to which program locations is stored.

10. Method according to claim 9, c h a r a c t e r i z e d in that a map of which transmitting network were previously associated with which program locations is stored.

11. Receiver for digital broadcast signals, preferably digital terrestrial television signals, where the receiver has a plurality of program locations said receiver comprising means for extracting information about the country of origin of the signal, the transmitting network, a unique service identification and a logical channel number, c h a r a c t e r i z e d in that

the receiver comprises initializing means for assigning the received signal to a program location in accordance with the extracted information and a set of assignment rules stored in the receiver.

12. Receiver according to claim 11, c h a r a c t e r i z e d that said initializing means for assigning the service corresponding to a received signal to a program location primarily assigns the service to the program location in the program location list corresponding to the logical channel number and that in case of conflict of logical channel

numbers preference is secondarily given to any broadcast signal containing information of country of origin corresponding to a predetermined indication of country preference.

13. Receiver according to claim 12, c h a r a c t e r i z e d in that said initializing means places any service not given country preference in a group of services having consecutive program location numbers in the list of program location numbers, the program location numbers being different from the respective logical channel numbers of the services.

14. Receiver according to claim 13, c h a r a c t e r i z e d in that the initializing means arranges services with the same country of origin are together in subgroups within said group of services not given country preference.

15. Receiver according to any one of claims 12 to 14, c h a r a c t e r i z e d in that in case of conflict of logical channel numbers and country of origin the initializing means gives preference to the signal with the highest signal strength.

16. Receiver according to any one of claim 12 to 14, c h a r a c t e r i z e d in that in case of conflict of logical channel numbers and country of origin the initializing means gives preference to any broadcast signal containing information about the transmitting network corresponding to a predetermined indication of network preference.

17. Receiver according to claim 16, c h a r a c t e r i z e d in that the initializing means places any service not given regional preference in a group of services having consecutive program location numbers in the list of program location numbers, the program location numbers being different from respective logical channel numbers of the services.

18. Receiver according to claim 17, c h a r a c t e r i z e d in that the initializing means places the group of services given neither country preference nor regional preference in subgroups of groups of services with the same country of origin.

19. Receiver according to any preceding claim, c h a r a c t e r i z e d in that the receiver stores a map of which logical channel numbers are allocated to which program locations.

20. Receiver according to claim 19, c h a r a c t e r i z e d in that the receiver stores a map of which transmitting network were previously associated with which program locations.

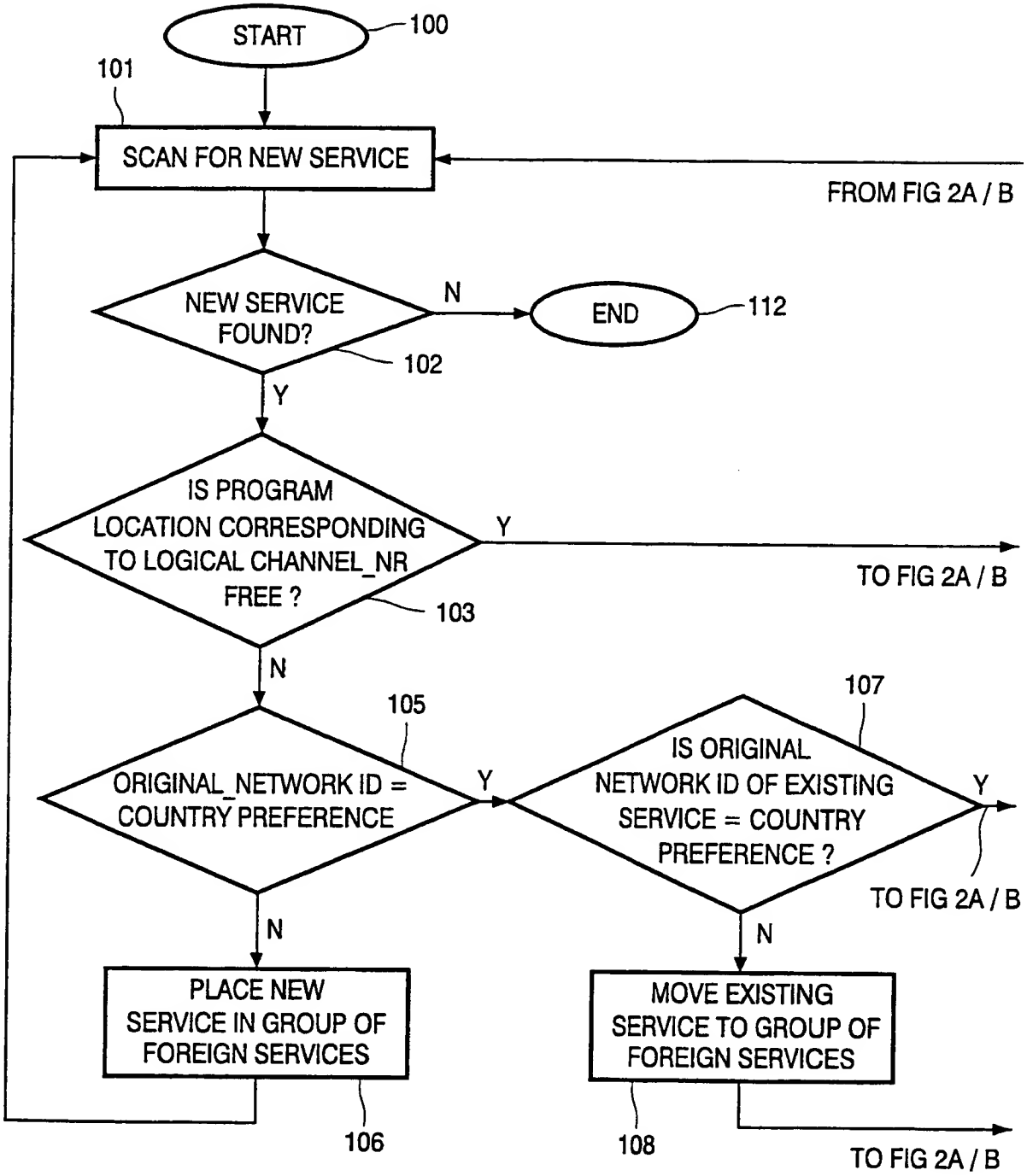
START
100
101
SCAN FOR NEW SERVICE
FROM FIG 2A / B
NEW SERVICE FOUND?
N
END
112
102
Y
IS PROGRAM LOCATION CORRESPONDING TO LOGICAL CHANNEL_NR FREE ?
Y
TO FIG 2A / B
103
N
105
ORIGINAL_NETWORK ID = COUNTRY PREFERENCE
Y
107
IS ORIGINAL NETWORK ID OF EXISTING SERVICE = COUNTRY PREFERENCE ?
Y
TO FIG 2A / B
N
N
PLACE NEW SERVICE IN GROUP OF FOREIGN SERVICES
MOVE EXISTING SERVICE TO GROUP OF FOREIGN SERVICES
106
108
TO FIG 2A / B

FIG. 1

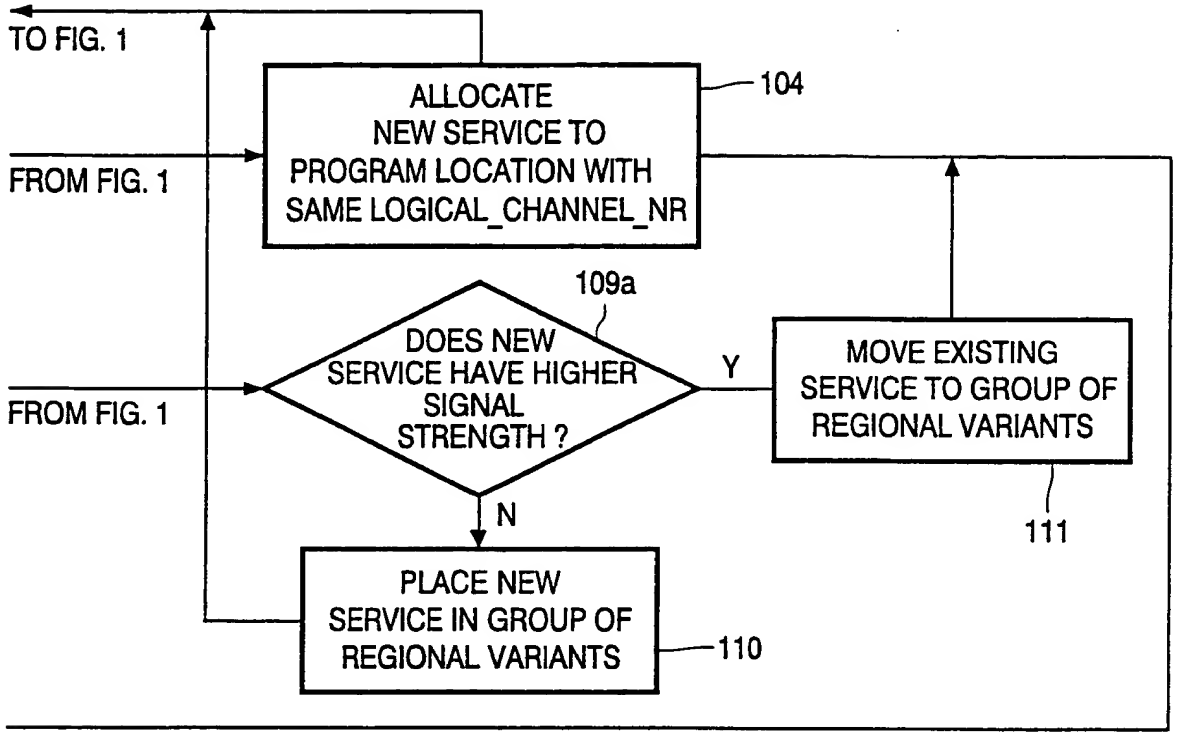
TO FIG. 1
FROM FIG. 1
ALLOCATE NEW SERVICE TO PROGRAM LOCATION WITH SAME LOGICAL_CHANNEL_NR
104
109a
DOES NEW SERVICE HAVE HIGHER SIGNAL STRENGTH ?
Y
N
MOVE EXISTING SERVICE TO GROUP OF REGIONAL VARIANTS
111
PLACE NEW SERVICE IN GROUP OF REGIONAL VARIANTS
110
FROM FIG. 1

FIG. 2A

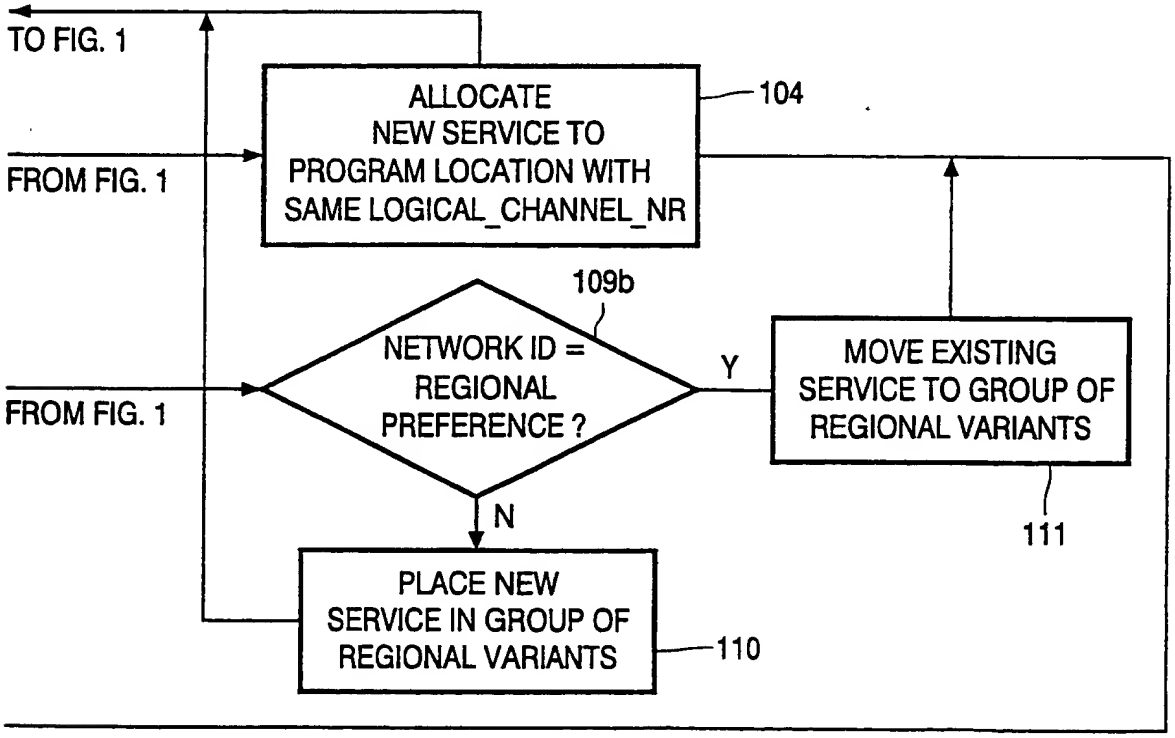
TO FIG. 1
FROM FIG. 1
ALLOCATE NEW SERVICE TO PROGRAM LOCATION WITH SAME LOGICAL_CHANNEL_NR
104
109b
NETWORK ID = REGIONAL PREFERENCE ?
Y
N
MOVE EXISTING SERVICE TO GROUP OF REGIONAL VARIANTS
111
PLACE NEW SERVICE IN GROUP OF REGIONAL VARIANTS
110
FROM FIG. 1

FIG. 2B

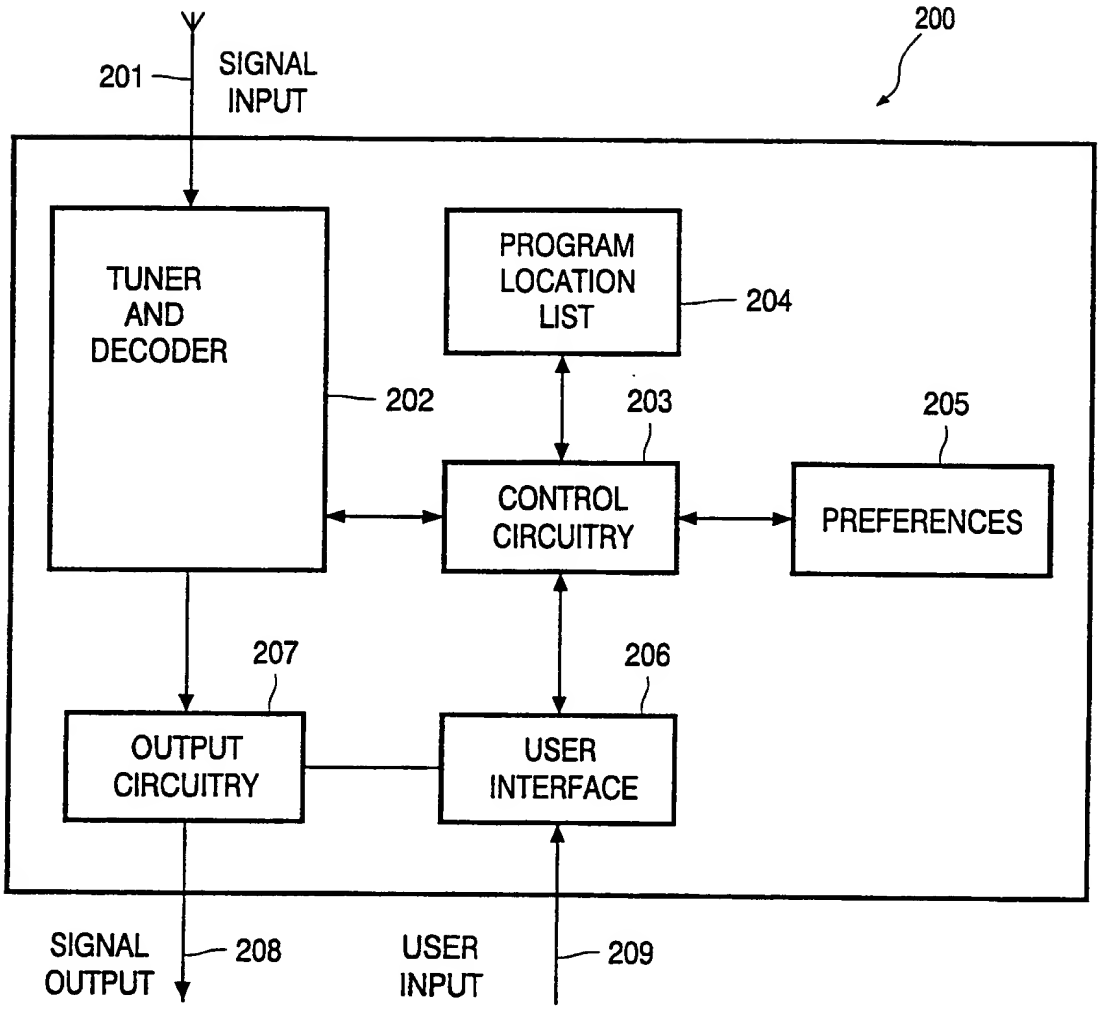
200
201
SIGNAL INPUT
TUNER AND DECODER
202
PROGRAM LOCATION LIST
204
203
205
CONTROL CIRCUITRY
PREFERENCES
207
206
OUTPUT CIRCUITRY
USER INTERFACE
SIGNAL OUTPUT
208
USER INPUT
209

FIG. 3

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
PHNL000561WO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/EP 00/ 10280	13/10/2000	14/10/1999
Applicant		
KONINKLIJKE PHILIPS ELECTRONICS N.V.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [ ] the text is approved as submitted by the applicant.

   [X] the text has been established by this Authority to read as follows:

   METHOD FOR ASSIGNING PROGRAM LOCATIONS IN A RECEIVER

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1

   [ ] as suggested by the applicant.

   [X] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

Form PCT/ISA/210 (first sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 00/10280

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H03J1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H03J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 898 910 A (ABE SHINICHI ET AL) 27 April 1999 (1999-04-27) column 2, line 34 - line 56	1-20
A	EP 0 050 328 A (SABA GMBH) 28 April 1982 (1982-04-28) abstract	1-20
A	EP 0 467 108 A (NOKIA UNTERHALTUNGSELEKTRONIK) 22 January 1992 (1992-01-22) abstract	1-20
A	DE 42 41 761 C (GRUNDIG EMV) 24 March 1994 (1994-03-24) column 2, line 48 - line 64	1-20

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
2 February 2001	09/02/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Peeters, M

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inter[redacted]al Application No
PCT/EP 00/10280

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 196 30 578 A (BOSCH GMBH ROBERT) 5 February 1998 (1998-02-05) abstract	2,12

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

...rorm...n patent family members

Inter...l Application No
PCT/EP 00/10280

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5898910 A	27-04-1999	JP 8223059 A	30-08-1996
EP 0050328 A	28-04-1982	DE 3039640 A	29-04-1982
		AT 8315 T	15-07-1984
EP 0467108 A	22-01-1992	DE 4022921 A	23-01-1992
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DE 4241761 C	24-03-1994	AT 164274 T	15-04-1998
		DE 59308281 D	23-04-1998
		EP 0601554 A	15-06-1994
DE 19630578 A	05-02-1998	WO 9805136 A	05-02-1998
		EP 0853846 A	22-07-1998
		JP 11513232 T	09-11-1999